**The Light company** Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

December 4, 1981
ST-HL-AE-763
SFN: V-0530



Mr. John T. Collins
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 1000
Arlington, TX 76012

Dear Mr. Collins:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Final Report Concerning
Westinghouse EMD Gate Valves

On July 2, 1981, pursuant to 10CFR50.55(e), Houston Lighting & Power Company notified your office of an item concerning closure problems with Westinghouse (W) Electro-Mechanical Division (EMD) manufactured gate valves. Our final report regarding this item is attached.

If you should have any questions concerning this item, please contact Mr. Michael E. Powell at (713) 676-2592.

Very truly yours,

A. W. Oprea, Jr.
Executive Vice President

MEP/blt
Attachment



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S 1/1

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Revision Date 10-29-81

Final Report Concerning
Westinghouse EMD Gate Valves
December 4, 1981

## I. Description of the Incident

On July 2, 1981, pursuant to 10CFR50.55(e), Houston Lighting & Power Company (HL&P), notified your office of an item concerning closure problems with Westinghouse (W) Electro-Mechanical Division (EMD) manufactured gate valves. W had identified to HL&P that several three (3) and four (4) inch gate type valves had been shown by tests and/or analyses by W to have a potential for not closing against differential pressure.

Subsequent to HL&P's July 2, 1981 notification, HL&P received NRC Inspection & Enforcement (I&E) Bulletin 81-02, Supplement #1, "Failure of Gate Type Valves to Close Against Differential Pressure", which identified that W had performed analyses which predicted that closure problems could be anticipated with 6, 8, 10, 12, 14, 16 and 18-inch gate valves in addition to the 3 and 4-inch gate valves.

An evaluation program is being conducted by W and includes flow tests and analyses. Based upon the results to date, W has determined that modifications will be necessary to valves supplied to the South Texas Project (STP) in order to assure that the functional requirements are met. However, failure of the valves to meet these requirements does not create a substantial safety hazard.

## II. Corrective Action

Depending on the system closing differential pressure requirements and the valve model in question, the modification to guarantee full closure can vary. The modification could involve any combination of the following items:

(1) Torque switch adjustment;

(2) Increasing the operator gear ratio to guarantee adequate thrust capacity at eighty percent (80%) voltage;

(3) Rewiring the operator for limit closing control;

(4) Changing the operator torque switch spring pack;

(5) Changing to a larger foot-pound rated motor; or

(6) Changing to a larger size Limitorque operator.

The modifications of the subject valves will be made in accordance with the W procedure for administering field changes. A Field Change Notice (FCN) will be issued by W which will provide the scope of the corrective action to be taken. Based on the current W schedule, the FCN for both South Texas Project (STP) Units will be issued by the end of March, 1982, with modifications/repairs to be completed by December, 1982.

III. Recurrence Control

A recurrence control program is not considered necessary because the situation appears to be unique to W EMD gate valves.

IV. Safety Analysis

An evaluation of the safety consequences of the valves failing to close was performed in response to NRC I&E Bulletin 81-02, Supplement #1. Based on the evaluation, failure of these valves to close would have no significant safety consequences. The attached table from our response to the subject Bulletin lists the subject W gate valves intended for use in safety-related systems, their planned service, the differential pressure against which they will be required to close, and the safety consequences of the valves failing to close.

ATTACHMENT

| W-EMD VALVE ID | PLANNED SERVICE APPLICATION | HL&P VALVE # (W) | MAXIMUM ΔP (psi) | FAILURE ANALYSIS |
|---|---|---|---|---|
| 3GM88FNB | Pressurizer PORV Block Valve | XRC 001 A, B (1-8000 A,B) | 2500 | The present design does not require the block valves to close under full flow conditions. These valves are used to isolate PORV's if they are leaking. The failure of one of these valves to close under full flow conditions would be the same as a Failed Open PORV (assuming PORV is already opened and fails to close). The consequences of this failure are covered by present accident analysis in the FSAR. |
| 6GM72FBA | Volume Control Tank Discharge Isolation | XCV 112 B (LCV-112 B) XCV 113 A (LCV-113A) | 100 | These valves in series are located on the VCT Discharge line that provides suction to the CVCS charging pumps. These valves are closed upon opening of the valves that permit CVCS charging pump suction from the RWST and when either SI signal or VCT lo-lo level signal is present. Failure of one valve to close completely may reduce the differential pressure across the second valve sufficient to permit its closure. Failure of these valves to close would have no significant safety consequences. |
| 6GM72FBA | CVCS Charging Pump Suction to RWST | XCV 112 C (LCV-112C) XCV 113 B (LCV-113B) | 200 | These valves are in parallel flow paths from the RWST to the CVCS charging pump suction header. These valves are normally closed and are used only in abnormal situations when the charging pumps are used to provide water from the RWST to the Reactor Coolant System. These valves are interlocked to prevent closure when an SI signal or VCT lo-lo level signal is present. Failure of these valves to close would have no significant safety consequences. |
| 4GM88FND | CVCS Letdown Upstream of Regenerative Heat Exchanger | LCV 465 LCV 468 | 2500 | These two valves in series provide isolation of the CVCS letdown from the RCS. These valves would be automatically closed on Pressurizer low level that might be caused by a break in the safety class 2 pipe of the regenerative heat exchanger downstream of the valves. The two valves in series provide redundancy. Failure of one valve to close completely may reduce the differential pressure across the second valve sufficiently to permit closure. If the blowdown is not |

| W-EMD VALVE ID | PLANNED SERVICE APPLICATION | HL&P VALVE # (W) | MAXIMUM ΔP (psi) | FAILURE ANALYSIS |
|---|---|---|---|---|
| | | | | terminated, the consequences are covered by present accident analyses in the FSAR. Failure of the valves to close completely has no unreviewed safety consequences. |
| 4GM74FEB | CVCS Letdown Containment Isolation Valves | XCV023 (8133) XCV024 (8134) | 700 | These valves provide a Containment Isolation function. High differential pressure would occur on a Containment Isolation Signal. For a pipe break inside Containment, the differential pressure across the valves would be reduced immediately, permitting the valves to close.<br><br>For failure of the two upstream isolation valves (Westinghouse EMD valves) in conjunction with a letdown pipe break outside Containment, there are motor-operated packless metal diaphragm valves used as Letdown Orifice isolation valves that could be manually operated to terminate flow. When the flow is reduced, the valves LCV 465, LCV 468, XCV 023 (8133) and XCV 024 (8134) would then be able to close. Also, partial closure of one valve may reduce the differential across the second valve sufficiently to permit the second valve to close. Failure of XCV 023 (8133) and XCV 024 (8134) to close would have no significant safety consequences. |
| 4GM78FPA | CVCS Charging Line Isolation | XCV 025 (8135) | 3100 | The failure of this valve for a pipe break inside or outside Containment reduces the redundancy for Containment Isolation. For outside Containment, there are 3 check valves downstream that would prevent blowdown of the RCS. For inside Containment, the Charging Pumps can be stopped and the differential pressure across the valve would be reduced immediately, permitting the valve to close. |
| 4GM72FBA | Charging Pump Suction Valve from Boric Acid Transfer Pump | XCV 218 (8358) | 0 | This valve is normally closed and provides a means to have CVCS Charging Pumps take suction from 4 weight percent boric acid solution. The valve is in series with a check valve; failure to close would permit flow from boric acid transfer pumps to the suction of the charging pumps. Flow may be stopped by turning off the BAT pumps. Backflow into BRS is precluded by check valve. The failure of this valve to close has no significant safety consequences. |

| W-EMD VALVE ID | PLANNED SERVICE APPLICATION | HL&P VALVE # (W) | MAXIMUM ΔP (psi) | FAILURE ANALYSIS |
|---|---|---|---|---|
| 16GM72FBA | Safety Injection Suction Valve from RWST | XSI 001 A, B, C (8801 A,B,C) | 200 | Valve is closed for recirculation phase following a LOCA. Failure of the valve to close would result in a loss of redundancy for preventing backflow to the RWST. Failure of the valve to close has no significant safety consequences. |
| 6GM77FHA | High Head Safety Injection Pump Discharge Isolation Valve/ Containment Isolation | XSI 004 A, B, C (8804 A,B,C) | 100 | This valve provides pump isolation and also serves as the Containment Isolation Valve. The valve is normally open. Failure of the valve to close against backflow from the RCS has no significant safety consequences because there are 2 check valves which could prevent blowdown of the RCS. |
| 6GM78FNB | HHSI to Accumulator Isolation Valve | XSI 006 A, B, C (8806 A,B,C) | 0 | This valve closes for switchover from Cold Leg injection to Hot Leg injection. Failure of valve to close during recirculation will degrade flow to Hot Legs. Pressure differential across valve can be reduced to permit closure by momentarily interrupting SI (by stopping pump or manual action). Failure of the valve to close reduces the redundancy for Hot Leg recirculation. |
| 6GM78FNB | HHSI to Hot Leg Injection Isolation Valve | XSI 008 A, B, C (8808 A,B,C) | 0 | This valve is opened to provide SI switchover from Cold Leg injection to Hot Leg injection. If switchover back to Cold Leg is required, failure of the valve to close would degrade Cold Leg injection flow. However, SI could be momentarily interrupted to reduce differential pressure across valve permitting it to close. |
| 16GM72FBD | Emergency Sump Recirculation Isolation Valve | XSI 016 A, B, C (8816 A,B,C) | 100 | This valve must open to permit SI recirculation. The valve is required for isolating a passive failure between the sump valve and the next motor-operated valve. High differential pressure should not be present when the valve is required to close. |
| 8GM74FEA | Low Head Safety Injection Pump Discharge Isolation Valve/Containment Isolation Valve | XSI 018, A, B, C (8818 A,B,C) | 100 | This valve serves as a pump isolation valve and as a Containment Isolation Valve. The valve is normally open. Reverse flow in the line is stopped by the inside Containment check valve. Failure of the valve to close reduces Containment Isolation redundancy. |

| W-EMD VALVE ID | PLANNED SERVICE APPLICATION | HL&P VALVE # (W) | MAXIMUM ΔP (psi) | FAILURE ANALYSIS |
|---|---|---|---|---|
| 8GM78FNB | LHSI to Hot Leg Injection Isolation valve | XRH 019 A, B, C (8819 A,B,C) | 200 | Same as for XSI 008 (8808) |
| 8GM78FNB | LHSI to Accumulator Isolation Valve | XRH 031 A, B, C (8901 A,B,C) | 200 | Same as for XSI 006 (8806) |
| 12GM78FND | Accumulator Tank Discharge Isolation | XSI 039 A, B, C (8949 A,B,C) | 0 | This valve is normally open during power operation and is closed only when required to prevent blowdown as RCS is depressurized in a normal shutdown. The accumulator may also be depressurized by venting the $N_2$ to the Containment. The failure of the valve to close under high differential pressure has no significant safety consequences. |
| 12GM88SEB | RHR Suction Isolation Valves from RCS | XRH 060 A, B, C (9000 A,B,C) XRH 061 A, B, C (9001 A,B,C) | 700 | These valves are normally closed valves and can only be opened when RCS pressure is less than approximately 425 psig. When the valves are open, they automatically close when RCS pressure is approximately 750 psig. If valves fail to close under high differential pressure, the operator can take steps to reduce RCS pressure until the valves are able to close. Also, with two valves in series, partial closure of the first valve may reduce differential pressure across the second valve permitting its closure. Failure of these valves to close would reduce redundancy. |
| 8GM74FCA | CSS Pump Discharge Isolation Valve/Containment Ioslation Valve | XCS 001 A, B, C (9100 A,B,C) | 200 | These valves are normally closed. They open to provide Containment spray and are used for Containment Isolation after Containment spray has been terminated. A check valve (IRC) would provide isolation capability. Failure of these valves to close reduces Containment isolation redundancy. |